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Guidelines For Working In Industrial Buildings 1 & 1A

In

The Technical Division

Development and Test Department

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Guidelines For Working In Industrial Buildings 1 & 1A

In The Development & Test Department

1.0 Introduction

This document describes the policies that regulate activities for personnel working in and visiting Industrial Building 1 (IB-1) and Industrial Building 1A (IB-1A). These policies apply to all Fermilab employees and all laboratory visitors working in the aforementioned areas.

The building layouts are shown in Figures 1-3. The primary function of this facility is to determine the performance characteristics of magnets and other devices used in particle accelerators. IB-1 production floor activity generally includes the construction of components for test systems, and maintenance and operation of the magnet test stands. The west side of the facility now includes additional laboratory space and a second floor office area. IB-1A, a separate building located just outside the northwest corner of IB1, is a utility building used to house ancillary equipment such as compressors and pumps.

Except for designated areas demarcated by green isles, **the production floor is an area requiring the use of safety eyewear and footwear.** At the north end of the production floor are three test stands used for measuring conventional magnets, which are either water-cooled or air-cooled. Each stand is powered and operated independently. One needs to be aware of the safety mats and other safety interlock devices when working in this area. The potential safety hazards in this area, and throughout the entire facility, are the high electric currents (ranging up to 18000A), high magnetic fields (which can attract iron objects and can affect pacemakers) and the possibility of low level radioactive magnets being present.

A helium refrigeration plant and cryogenic magnet test stands are located half-way along the East side, and at the South end of the IB-1 building. In addition to the risks associated with the conventional test stands, there are cryogens present – low temperature gases and liquids, typically nitrogen and helium – during cold test operations. Cryogens present an exposure risk as well as an oxygen deficiency hazard. Compressor machinery for the helium refrigerator is housed in the IB1A building, and liquid Nitrogen is stored in a large vertical dewar located between these buildings. IB-1A, also known as the “compressor shed”, is a very noisy environment that requires the use of hearing protection.

Equipment and building construction and maintenance are constantly evolving processes that require an awareness of the present circumstances and potential dangers.

2.0 Access/Restrictions

- 2.1 All visitors and outside contractors are expected to report to either the shift operator in the control room, the IB-1 Building Manager or the IB-1 Alternate Building Manager unless previous arrangements have been made. It is important that the Control Room Operator, Building Manager, or an Emergency Warden be aware of the presence of the working visitor in the event of an emergency situation. A building orientation will be given by the building manager or assistant to familiarize visitors with the alarms, safety rules, hazardous areas, safety interlocks and

emergency procedures. A phone has been provided outside the control room door, to call the shift operator for after-hours access to IB1.

- 2.2 During normal workdays, doors to IB1 are opened at 0800 and locked at 1600. After hours and on weekends, the final person leaving the building bears the responsibility to ensure that all of the egress doors (see Figure 1) are locked. Upon approval of the IB-1 Building Manager, **long term visitors** may be temporarily issued keys to facilitate working during non-standard hours.
- 2.3 **Children** under the age of 18 years are not permitted on the production floor of IB-1 nor in any of the offices within IB-1 unless specific permission is granted by the Development & Test (D&T) Department Head in consultation with the Technical Division Senior Safety Officer (SSO). Requests for access will be reviewed on a case-by-case basis. Access by children under 18 years of age also requires Division Head approval and a Technical Division escort at all times. A Technical Division escort is a Fermilab employee who is knowledgeable of the local hazards and understands the exposure to these hazards.
- 2.4 A lift is located in the South West Corner of IB-1, for handicap-access to the second floor of the IB-1 addition office area.
- 2.5 **Children** under the age of 18 are permitted in the control room and in IB-1B offices while under direct adult supervision.
- 2.6 **Any person dependent on a pacemaker** must be made aware of the **magnetic field hazards** before entering IB-1. High magnetic fields can affect the operation of a pacemaker. The building manager or designate must be informed of this condition before allowing entry to the production floor.

3.0 General Safety Information is available in the following areas:

- 3.1 The Environment, Safety and Health (ES&H) manual can be accessed online from the Fermilab web site. This manual provides an in-depth look at the Fermilab safety policies. A hard copy of the manual is available in the Building Manager's office.
- 3.2 The ES&H bulletin board is located at the Northwest side of the building next to the washrooms. This board lists important information regarding safety procedures, building management, emergency numbers, etc.
- 3.3 The Right To Know center is located outside the main control room in the Southeast area of the building. This station is now a web-based kiosk (PC terminal) that contains the **Material Safety Data Sheets** (MSDS) for all chemicals used or stored in IB-1. These records include health hazards, fire and explosive hazards, protective equipment and disposal information. Chemicals may not be brought into IB1 without the approval of the Building Manager and provision of the most recent MSDS.
- 3.4 All non-supervisory personnel are strongly encouraged to contribute to the Grass Roots Safety Committee by attending the monthly meetings to discuss their safety concerns. Minutes of these meetings are distributed to supervisors and division management for remediation of action items.
- 3.5 This document and other MTF-related safety requirements and procedures are available from the MTF web site, http://wwwtsmtf.fnal.gov/MTF_index.html

4.0 Safety Training

- 4.1 **Minimum training** should include Hazard Communication, and General Employee Radiation Training (**GERT**). Additional training may be required according to specific job assignments. It is the supervisor's (or contact person's) responsibility to ensure that personnel working in IB-1 are properly trained and qualified to perform their assigned task: normally this training is mandated by the ITNA (Individual Training Needs Assessment) information entered by the supervisor.
- 4.2 **Crane operation** in IB-1 is restricted to employees who have received approved training and can demonstrate competence in the hoisting and rigging activities proposed. A list of authorized employees is posted on the crane control unit.
- 4.3 **Machine operation** in IB-1 requires a minimum of Technical Division machine shop safety training. Several courses are available which cover the many different devices used in IB-1. Posted on each machine is a list of authorized users.

Maintenance and repair of certain mechanical equipment in IB1 and IB1A requires specialized training and may involve the use of written group LockOut/TagOut procedures to ensure the safety of all workers involved. Following is a list of all written mechanical LOTO procedures (annual re-training required):

MTF-REF-3010-0	MTF CTI-1500 Compressor Skid
MTF-REF-3010-1	MTF Pressure Vessel
MTF-REF-3010-2	MTF Helium Dryer
MTF-REF-3010-3	Kinney 1 Liquid Ring / Booster Pump
MTF-REF-3010-4	Kinney 2 Liquid Ring / Booster Pump
MTF-REF-3010-5	CCI Cold Compressor
MTF-REF-3010-6	(obsolete)
MTF-REF-3010-7	Adams Automatic Strainer
MTF-REF-3010-8	Air Compressor / Dryer

- 4.4 **Fork truck** operation requires on-site training and certification.
- 4.5 **ODH** work areas have specific requirements for access. The mezzanine on the northeast section of the building, all areas within 3 feet of the production floor ceiling during refrigerator operation, and the chiller bay (Northern section) of the compressor building (IB-1A) are classified as ODH-1 areas. ODH qualification for working in these areas includes medical approval for ODH work, ODH training, personal oxygen monitor and self-rescue atmosphere respirator. Visitors without the required training, and/or medical evaluation must obtain authorization from the SSO and be escorted by ODH qualified personnel.
- 4.6 **Radiation safety**; IB-1 is classified as a Radioactive Materials Area. Access to this facility is restricted to personnel who have received, at a minimum, General Employee Radiation Training (GERT). Specific assignments may require further certification as deemed necessary by the supervisor or SSO. Non-trained personnel may enter the production floor area provided they are escorted by personnel who have received the necessary training.

No radioactive source or material with activity rated above Class 1 is allowed in IB-1 without written permission from the Division Head. The IB-1 Building Manager shall be notified prior to the introduction of any radioactive materials into the

building. This notification will allow for the proper review of safety issues and preparation of appropriate work and/or storage areas. IB-1A may not receive radioactive materials at any time.

- 4.7 **Electrical safety:** Personnel are protected at the test stands and at power supplies during powered measurements by **safety interlocks**, which de-energize the power supply if the interlock is broken. One should be aware of the energy sources and the interlock system in the area one is working in. Of particular note in the conventional magnet test area are the safety mats at each stand, and the photoelectric cell along stand B.

Any and all changes to power systems or interlocks are governed by a set of five electrical safety system documents (MTF-ELEC-01, 02, 03, 04, 09) that describe the hazards and power system interlock architecture, and procedures required for making changes to each system. **These documents are required reading** for all supervisors, and for all workers who use or work on these systems: **each worker must** review them and **sign an acknowledgement form** for this every two years.

In order to perform work (i.e., make power bus connections or perform power supply maintenance and repair) on power systems capable of generating high voltage (>50 Volts) or high currents, the worker must be trained in and utilize the **appropriate LOTO procedures** for each system. Following is a list of all written electrical LOTO procedures (annual re-training required):

MTF-ELEC-05	CPS-1 (Tevatron) 10kA Power System
MTF-ELEC-07	Stands 3/4/VMTF Mechanical/Electrical Bus Work
MTF-ELEC-08	CPS-3 (Stand3/4/VMTF) 30kA Power System

5.0 Personal Protective Equipment Policy

- 5.1 **Protective eyewear** is required in all work areas of the production floor and lab areas in IB-1 and in all areas of IB-1A. Visitor safety glasses can be found in dispensers located at the entrances to IB-1. Except when involved in operations that mandate their use, safety glasses are not required for individuals on the green walkways, on the north mezzanine, in the control room, lunch room, midway, tech rooms and office areas.

Other types of eye protection include safety goggles, welding helmet and face shield. For further information regarding proper use of protective eye ware, refer to the ES&H Manual, Chapter 5102 or ask your supervisor. The following job operations require eye and/or face protection regardless of location:

- When operating, or in the vicinity of the operation of, any machine shop equipment including non-powered equipment, e.g. hand shear, turret punch etc.
- When operating, or in the vicinity of the operation of, any powered hand tools.
- When using non-powered chip producing hand tools, e.g. hand saws, files, punches, etc.
- All striking operations involving metal hammers, chisels, punches, etc.
- All operations involving soldering irons.
- All operations involving flammable gas burning torches.
- All operations involving compressed gases or air including changing regulators.
- When handling or transferring liquid cryogenics.

- 5.2 Approved **safety shoes** are required in all work areas of the production floor and lab areas, and in IB-1A. Safety footwear is not required for individuals who remain in

the green walkways, control room, midway, tech rooms or offices unless the work performed presents a potential foot injury or special exemption is justified by the medical office.

- 5.3 **Hearing protection** is required in IB-1A.
- 5.4 Handling or transfer of **liquid cryogen**s requires safety glasses, a face shield and cryo-protective gloves.
- 5.5 **TLD's** (Thermo-Luminescent Detectors) are required only when working with radioactive materials or when entering a radiation area. Before entering a radiation area, one must read the RWP (Radiation Work Permit) for information regarding the training requirements, personal protective equipment and other relevant factors. Visitor TLDs are available through the SSO.
- 5.6 Use of a **pocket dosimeter** is advised when working on Class 2 radioactive material.
- 5.7 **Personal oxygen monitors** are required when entering an ODH area. See training segment of this document for further requirements.
- 5.8 Other protective equipment may be required or encouraged relevant to the work performed.

6.0 Alarms and Emergency Response

Important: **3131** is the lab phone number for all emergencies. When operator answers, state your name, the location and the nature of the emergency. Remain on the phone until the operator confirms that all necessary information has been obtained. The local emergency map and response plan is shown in Fig. 4. The Local Emergency Procedures documents for IB-1 and IB-1A have been appended to the end of these worker guidelines.

- 6.1 **Fire Emergencies.** A **constant klaxon** indicates a fire alarm in IB-1, IB-1A, IB-2, IB-2A or the midway. In the event of a fire alarm, all personnel must **immediately evacuate** the building through the nearest safe exit and assemble **along the southwest corner of the building**.

When a fire is identified, one should activate the fire alarm prior to exiting the building and dial 3131 from a safe location. Indicate the type of fire if known and whether any chemicals or radioactive materials may be involved. For those trained in Fire Extinguisher Safety, extinguishers of different types are available at several locations throughout the buildings.

- 6.2 **Weather Emergencies.** In the event of severe weather (tornado), a **steady siren** will sound throughout the entire industrial area. The **designated shelter area** for IB-1 is in the **lunch room** located in the northwest corner of the building, and the IB-1 **Rest Rooms** serve as overflow shelter areas.
- 6.3 **Medical Emergencies.** Immediately dial x3131 to report the nature of the emergency. An eyewash station is located on the south wall of the building.
- 6.4 **Oxygen Deficiency Hazard Emergencies.** A **whooping alarm** indicates an ODH emergency. All personnel must **immediately evacuate** the building through the nearest safe exit and **assemble along the southwest corner of the building**. For

alarms. Unlike the fire alarm, the ODH alarm does not inform the security dispatcher.

7.0 Additional Building Policies

- 7.1 **Eating/Drinking** is permitted in all areas except in the presence of radioactive or harmful materials.
- 7.2 **Smoking** is prohibited in all Industrial Area buildings.
- 7.3 **Parking Lot:** Parking is not allowed against any of the industrial buildings: illegally parked vehicles will be towed at the owners expense. Speed should be kept to a minimum in the parking lot, as pedestrians are often crossing and visibility may be incomplete.

8.0 Compliance

It is expected that all working personnel will comply fully with these policies and procedures. These guidelines have been developed to ensure that all operations at IB-1 are conducted in a safe manner consistent with Fermilab ES&H policies. Non-cooperation or flagrant disregard for these policies are grounds for disciplinary action or denial of access to these facilities.

Prepared By: Mark D Thompson May 16, 2000
Revised By: Michael A. Tartaglia December 16, 2004

Reviewed By: Cosmore Sylvester

Reviewed By: Ruben Carcagno

Reviewed By: Dean Validis

Approved By: Michael J. Lamm



Technical Division
Guidelines for Working in Industrial Building 1 & 1A

Appendix A

Fermilab Emergency Phone Number - 3131

Position	Name	Phone	Page	Long Distance Page Or Home Phone
TD Senior Safety Officer	Richard Ruthe	5424	1158	(630) 266-6842
ST Radiation Safety Officer	Mike Herr	3382	0753	(847) 536-2668
TD Waste Coordinator	Mike Herr	3382	0753	(847) 536-2668
IB-1 Building Manager	Dean Validis	2570/3700		()
IB-1 Alternate Building Manager	Mark Thompson	2569/3700		()
Department Head	Mike Lamm	4098	N/A	(630) 910-6171
Head of Test Operations	Mike Tartaglia	3890	N/A	(708) 881-4793

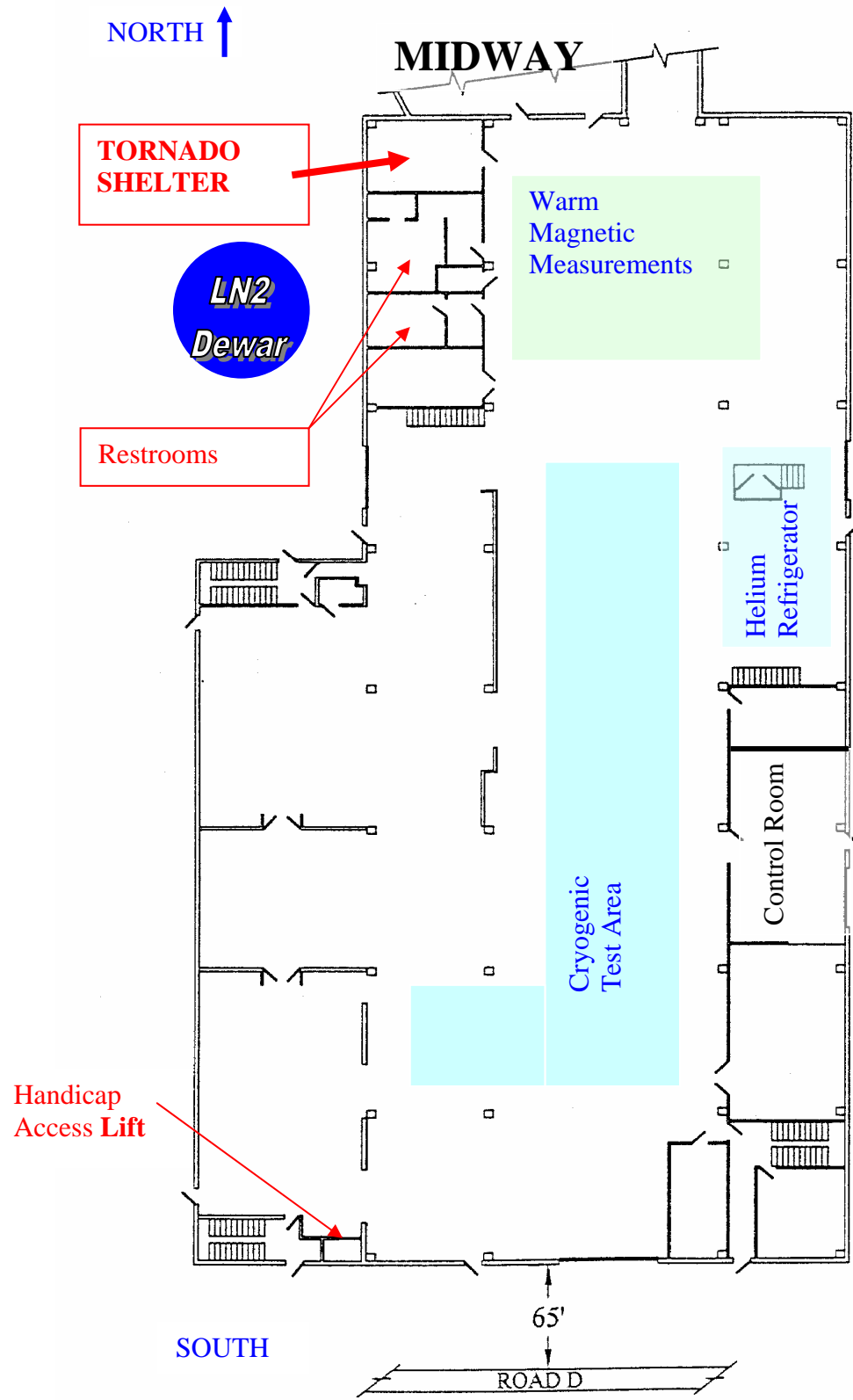
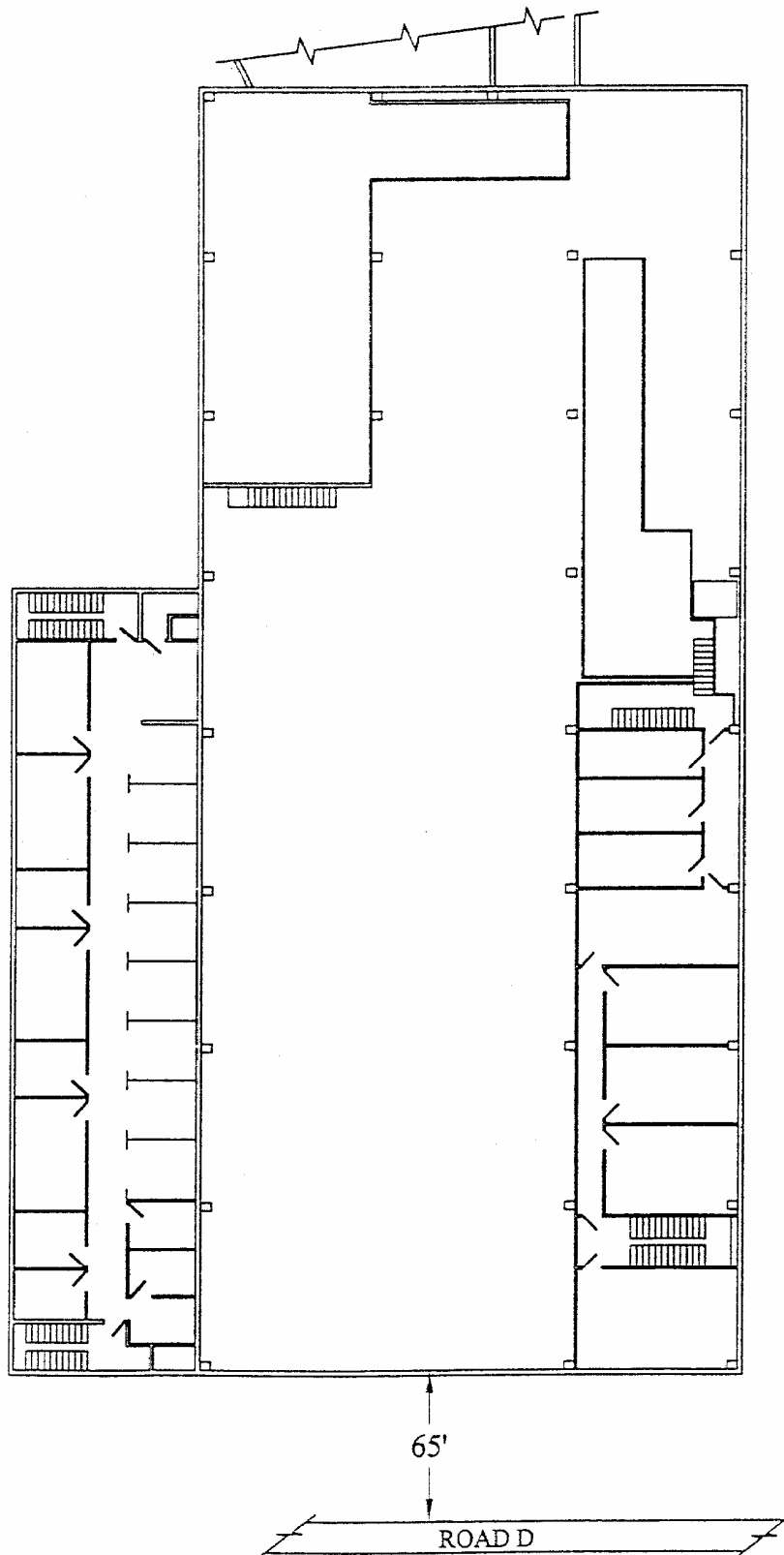
Figure 1: Industrial Building 1 Production Floor Layout

Figure 2: Industrial Building 1 Office Layout

**Figure 3: Layout of Industrial Building 1-A
(Compressor Building)**

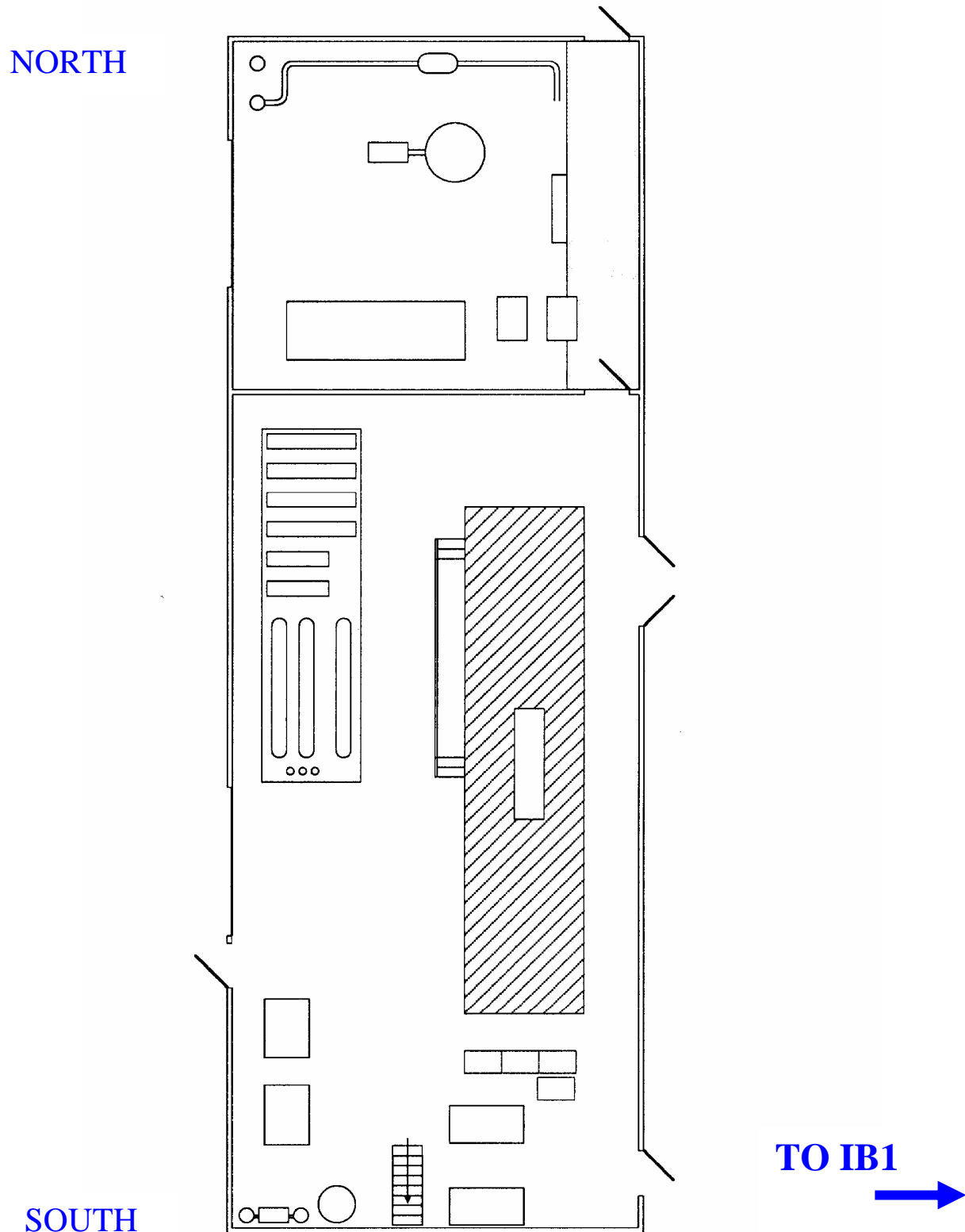
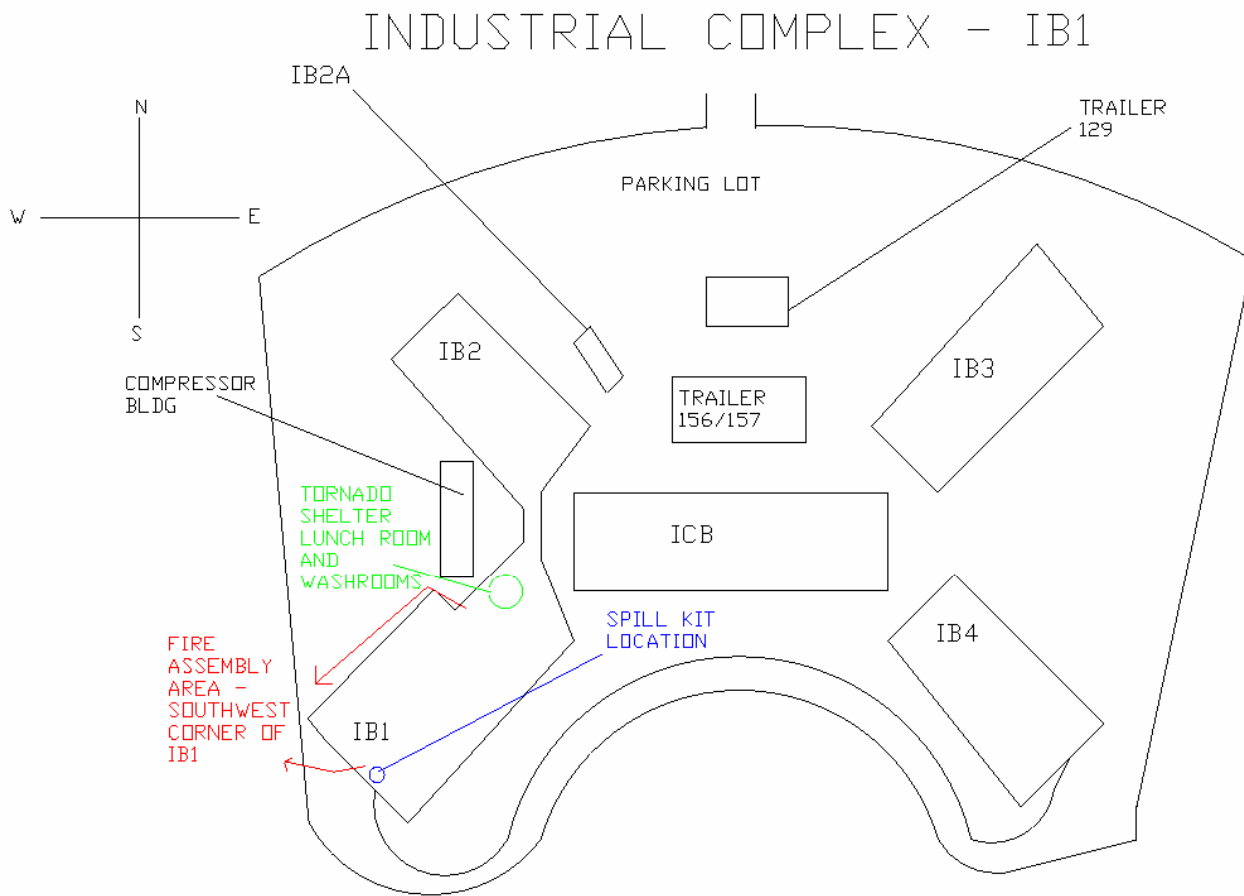


Figure 4: Local Emergency Map and Response Plan

TECHNICAL DIVISION – INDUSTRIAL BUILDING 1

LOCAL AREA EMERGENCY PROCEDURES

Warning Devices:	<u>Emergency</u>	<u>Sound</u>	<u>Actions Required</u>
	Fire	Steady Alarm	Exit the Building
	Hazardous Atmosphere	Whooper Alarm	Exit the Area
	Weather Emergency	Steady Outdoor Siren	Go to Designated Shelter
		Voice Instruction (Radio)	Follow instructions provided

Fire:

1. Person discovering the fire: **Activate the pull station at the door**; evacuate the area; from safe location dial 3131 and provide all the requested information.
2. Meet at the assembly point: **Parking lot on the southwest corner of Industrial Building 1.** (See map)
3. If fire involves radioactive materials call Mike Herr, the Technical Division Radiation Safety Officer at ex. 3382

Tornado/Severe Weather:

Upon receiving word of a **Tornado Watch**:

1. Be prepared to move to the designated shelter (**Lunch room and the washrooms in the northwest corner of Industrial Building 1**) if conditions worsen.
2. Minimize outdoor activities, and close all windows, drapes/shades, drawers, cabinets, etc. that are not in use.

Upon receiving word of a **Tornado Warning**:

1. Move **immediately** to the designated shelter: **Lunch room and the washrooms in the northwest corner of Industrial Building 1.** (See map)
2. Remain in shelter until advised by an emergency warden or the radio that the danger has passed.

Personal Injury/Fatality:

1. Person discovering the injury/fatality: Dial 3131 and provide all requested information.
2. Have someone go to the main entrance of the facility to await and guide the Fermilab Fire Department to the victim.
3. Contact the Building Manager (Dean Validis at ex. 2570), and notify him of the situation.

Material Release:

In the event of a material spill or release, it is important to first determine whether an emergency situation exists. **If there is any indication of imminent danger to personnel, call 3131 immediately.** Otherwise the decision concerning type of response should be made by considering questions of type and quantity of material released, location of the spill, medium involved, extenuating circumstances (e.g., fire, injury) and whether the spill can be effectively contained.

General rule of thumb:

- Spills of non-hazardous materials and small quantity spills (16 oz. – 1.5 L) of hazardous materials will be considered as **non-emergency** in nature.
- Larger quantities of hazardous materials will be considered **emergency** in nature.

If the spill has been determined to be of a **non-emergency nature**, perform the following spill containment and cleanup procedures:

1. Stop the spill, e.g., close system valves, shut down pumps, pick up overturned buckets, etc.
2. Contain and limit the spread of spilled materials with rags, oil absorbent pads, booms, oil dry absorbents, and containment pans. Cover any drains exposed to the spill. Use protective equipment (e.g., gloves) as necessary. (**Spill kit location: South wall of building**) (See map)
3. Contact Technical Division ES&H Group at ex. 3120 for any additional assistance with cleanup and waste disposal instructions.

If the spill has been determined as an **emergency** then perform the following procedures:

1. Evacuate the area, call 3131 from a safe location and provide all the necessary information.
2. Secure area from access by other employees.
3. Provide the Incident Commander (responder in orange vest with Incident Commander written on it) with the Material Safety Data Sheet, (MSDS) for the product (if it can be done from a safe location), location of spill, and any other relevant information.

Oxygen Deficient Hazard:

1. If alarm sounds (strobe and sirens), evacuate area, and from a safe location call 3131 and provide all the requested information.
2. Contact the Building Manager (Dean Validis at ex. 2570), and notify him of the situation.
3. Prevent access by other employees.
4. Wait for authorities to analyze and clear the hazardous area before reentering the area.